Mark Century* 100L
Numerical Contouring Control

A packaged Mark Century two-axis system designed for automatic operation of turning machines

*Trademark of General Electric Company

GENERAL ELECTRIC

Mark Century 100L

numerical contouring control easily justified in any plant . . .

Mark Century packaged numerical controls are available in several models—each tailored to a special type or group of machines. The 100L control is designed particularly for use with lathes, and incorporates many capabilities previously available only in much more expensive custom-designed models. This range of capabilities enables the General Electric Mark Century 100L control to meet any lathe requirement except the most unusual turning jobs.

There are other GE packaged systems for point-to-point operation, turning, profile milling, and boring. All come in a basic design with a number of pre-engineered options which can be added inexpensively for extra versatility. The user benefits from the packaged-design concept by getting traditional Mark Century performance on machines of his choice—without paying for unnecessary custom engineering.

Furthermore, all GE packaged controls are similar in design and construction. This compatibility can reduce operating costs significantly where several Mark Century controls are in use because training expenses are less and overall operating efficiency is improved as a result of similarities in programming and maintenance.

The 100L control is offered by leading builders of turning machines. These machine tools with Mark Century 100L controls offer the user outstanding value.

GECENT postprocessor, part of the computer software support package available to Mark Century N/C owners, simplifies continuous-path programming by quickly converting control data generated by the APT computer program to input for the numerical control.

Highly reliable

The Mark Century 100L control employs the same high-quality construction standards and components found in all General Electric Mark Century controls. Furthermore, reliability of the 100L control is backed by General Electric's more than a decade of experience in building numerical controls for over 150 different U.S. and foreign machine-tool manufacturers.

The full inherent reliability of transistorized, printed circuit boards is put to use on the GE Mark Century 100L control. Input data is distributed, stored, and acted upon by solid-state circuitry. Materials, fabrication methods, and components used meet the strictest industrial standards.

Total service package

When the Mark Century 100L control is delivered to your plant, GE startup and check-out specialists are on hand to assist with installation and make certain the control operates according to specifications. And should you need fast, skilled maintenance service, General Electric N/C Service Engineers from a nationwide network of over 50 offices can provide it.

But General Electric's service package doesn't stop there. To help your personnel care for the Mark Century 100L control after installation and start-up, a two-week maintenance training school is conducted at the factory. Also included in the most complete service package in the industry today are:

- Automatic check tapes
- Unmatched product warranties
- Local stocking of replacement parts
- Complete service and installation manuals
- Printed circuit board exchange plan
- Full computer software support
- Service engineers on call 24 hours a day

for two-axis turning machines

The Mark Century 100L control is a two axis N/C system specially designed for turning and boring operations. Features such as 3-digit spindle and tool codes, tool offsets, full range of thread-cutting provisions, and circular interpolation for manual programming give it the capability for essentially all horizontal or vertical lathe applications.

Maximum flexibility for turning

The Mark Century 100L control provides for changing tools automatically to reduce delays on multiple tool programs. Tool changing is quick and simple—initiated each time a different "t" code is ready Any pair of tool offsets may be used with any turret.

As an optional feature, digital synchronization between spindle and feed drive permits thread-cutting of almost any type of design.

The Mark Century 100L N/C accepts incremental commands, has buffer storage, and is a linear/circular interpolation system. Straight cuts and slopes up to 9.9999 inches of departure, or arcs up to 9.9999 inch radius may be programmed in one block. Short dimension preparatory commands are provided for departures or arc radii less than one inch. This reduces cycle execution time. Electrical resolution is ±0.0001 inch with absolute control positioning accuracy of ±0.0004 inch.

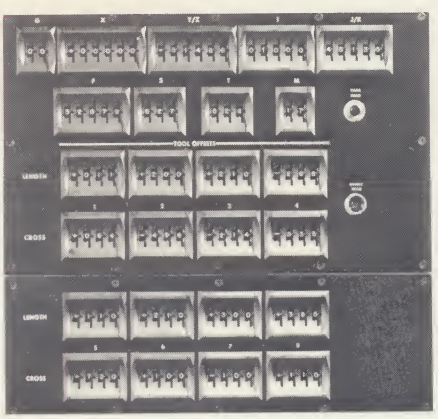
All these features make the Mark Century 100L lathe control best suited for the widest range of turning applications—at a cost greatly below conventional custom-designed systems

Simplified programming

To make programming and maintenance easier, the Mark Century 100L control has a binary-coded decimal format using standard EIA, 8-channel punched tape that is read by a photoelectric tape reader at a speed of 300 characters per second. In addition, the control may be operated on manual mode or by jog push buttons.

To save time, the Mark Century 100L control operates at high traverse speeds without the need to program acceleration and deceleration steps between traverse and feed rates. Up to 275-ipm traverse and 40-ipm feed rates may be used.

Insertion of complete operation commands by manual data input panel is a valuable aid in setup, initial program checkout, maintenance, and prototype work.



Easy to operate

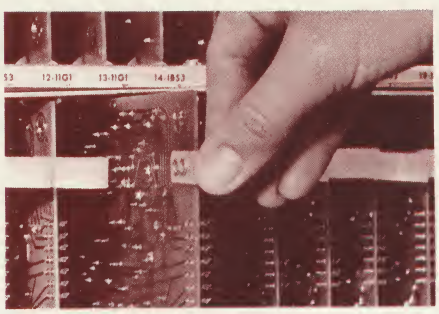
The console on the Mark Century 100L control is designed for maximum operator handling convenience. Miniaturized push buttons and other operator devices are functionally arranged on a sloping panel across the top front of the unit.

A check tape and condition-indicator boards provide fast, thorough checkout of the control-reading and data-storage circuits.

The logic-circuit portion of the control system is functionally arranged in modularly constructed panels of plug-in printed circuit boards. To make board changing easy and foolproof, both the boards and rack slots are identified by function code.

A modern NEMA 1, air-conditioned, floor-mounted enclosure houses all control components. Both plug-in control connections and swing-open gasketed doors—front, back, and top—provide easy access to all parts of the unit.

Measuring 52-inches wide, 42-inches deep and 74-inches high, the Mark Century 100L control has a heavy-gauge steel cabinet with logic wire connections that are wrapped instead of soldered for high reliability and performance.



Mark Century 100L

numerical contouring control

Standard Features

High-speed Reader — 300-characters per second with 4⅝-inch reels.

Full Manual Data Input — Thumbwheel switches can insert full operation commands for manual operation in setup and prototype work.

Incremental Feed Switch—Permits manual movement of selected increments from 0.0001 to 1.0 inch.

Jogging Mode—Provides rapid manual movements to aid setup and maintenance.

Sequence Number Readout — Displays program block in process, enabling speedy search of program sequences.

Programmed Dwell — Delays slide movement up to 99.999 seconds for tool changing and other purposes.

Spindle Speed Selection—Up to 1000 different spindle speed codes are available.

Tool Selection—Any pair of tool offsets may be programmed with any turret position by 3-digit "t" codes.

Tool Offsets—Four pairs of thumbwheel switches provide up to 0.0999 inch offsets on the X and Y/Z axes.

Miscellaneous Functions—Up to 100 commands may be used to control functions such as spindle direction and gear changing.

Maximum Feed Rate — Feed rate numbers as large as five digits to a maximum of 500.00 may be programmed.

Feedrate Override—A selector switch allows operator to vary programmed feedrate from 0–120% as needed for setup operations.

Zero-positioning—Push buttons move all motions to zero position, synchronizing machine to start contouring program.

Block Delete—Tape code and hand switch permit control to skip blocks of data which don't apply to present operation.

Feedhold Push Button — Can stop motions anytime without losing synchronization.

Overtemperature Protection — Warns operator of heated conditions in the control cabinet.

Sprocket-hole Verification—Prevents misreading due to improper alignment and timing of the tape in reader.

Parity Override—Permits tape identification on the leader by ignoring everything prior to an end-of-block code.

Servo Drives — Either SCR electric motor, or electro-hydraulic systems may be provided.

Tape Parity Check—Stops all motion and lights an error light indicating a tape error.

Out-of-synchronism Protection — Automatic error limit prevents difference between commanded and actual positions from exceeding a predetermined amount.

Machine Mode Selector — Permits control to be operated in three modes:

Automatic — All machine commands come from programmed tape.

Semi-automatic — Machine operates from commands entered by operator on manual-data-input panel.

Manual—Operator may direct motion by jog buttons.

Optional Features

Threadcutting — For longitudinal, face, and tapered threads—variable and constant leads—up to 9.9999 inches per revolution.

Extra Tool Offsets—Up to four additional pairs of tool offsets may be added to the standard four pairs as needed to control multi-tool turret lathes.

Emergency Tool Retract — Retract button instantaneously withdraws tool in direction assigned by turning mode.

High-speed Reader—Permits reading of up to 500 characters per second, has 8-inch reels.

Full-floating Zero — Differential resolvers allow programmer to establish zero reference point at any desired location.

There is a Mark Century numerical control system to fit your needs, whatever your performance requirements. For more information contact a General Electric Sales Office or your machine-tool builder.

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